



PRE-TIP STUDY REPORT

**US 421 Improvements
TIP Project U-2703**

Boone, Watauga County

August 2008

PRE-TIP STUDY REPORT

US 421 Improvements TIP Project U-2703

Boone, Watauga County

Prepared by the:

Transportation Planning Branch (TPB),
North Carolina Department of Transportation

Project Engineer: Alena R. Cook, P.E.

TPB Manager: Mike Bruff, P.E.

*Pre-TIP Community Study & Citizen Informational Workshop
Summary prepared by URS Corporation*

In Cooperation with:

Federal Highway Administration (FHWA)
US Army Corps of Engineers (USACOE)
US Fish and Wildlife (USFWS)
NC Division of Natural and Environmental Resources (DENR)
NC Division of Water Quality (DWQ)
NC Wildlife Resources Commission (WRC)
NC State Historic Preservation Office (SHPO)
High Country Rural Planning Organization (RPO)
Town of Boone
Watauga County

August 2008

This Page Intentionally Left Blank

Executive Summary

This report documents the Pre-TIP Study of proposed improvements to US 421 in the vicinity of Boone, Watauga County. Following the National Environmental Policy Act (NEPA)/ Section 404 of the Clean Water Act Interagency Merger Process, this Pre-TIP Study enabled the Merger Project Team to reach concurrence on the first two points (Purpose and Need, and Alternatives to be Carried Forward for Detailed Study) prior to the proposed improvements being funded in the Transportation Improvement Program (TIP).

NCDOT initiated this study in 2002 based on a request by the Town of Boone to begin a more detailed study of options for improvements to US 421, including consideration of recommendations from a local task force that had formed in 1999. The Merger Project Team met on September 18, 2002 for a Scoping/ Kick Off Meeting to determine the study process and study area boundary. The Team met again on January 22, 2003, reaching concurrence on Concurrence Point 1: Purpose and Need (refer to Appendix C). NCDOT held a scoping meeting on December 2, 2003, to further review the project and gather additional information.

As part of the alternative analysis for this study, information was developed for various options based on the traffic benefits and the impacts to the natural and built environment. A precursory community impacts assessment, titled '*Pre-TIP Community Study*' (as finalized January 2005), was prepared for NCDOT-Office of Human Environment by URS Corporation.

Information on the purpose and need for the project and preliminary corridor alternatives were shared at a Citizen's Informational Workshop on March 11, 2004. Comments were received through provided comment forms and a 'Post It Board' exercise, where citizens were asked to post their top 4 goals for the proposed project. These comments were analyzed and compiled in order to inform future project decisions, as documented in the report prepared for NCDOT's Transportation Planning Branch by URS Corporation entitled '*Summary of Citizens Comments and Concerns*', dated September 26, 2004.

The Merger Project Team met again on March 15, 2005 to consider all the information on alternatives. After reviewing additional information distributed May 23, 2006, the Merger Project Team reached concurrence on Concurrence Point 2: Alternatives to be Carried Forward for Detailed Study by December 2006 (refer to Appendix D). The Alternatives to be Carried Forward, as shown in Figure 7, were selected based on meeting the purpose and need for the improvement, providing the needed traffic benefits while minimizing impacts to the human and natural environment, and public input.

The primary outcomes of the Pre-TIP Study are a formal concurrence on the Purpose and Need for the proposed improvements and formal concurrence on the Alternatives to be Carried Forward for Detailed Study. After the project is funded in the TIP, this information is intended to serve as the starting point as the project is taken through the remainder of the NEPA/ Section 404 Merger Process.

This Page Intentionally Left Blank

TABLE OF CONTENTS

<u>Executive Summary</u>	i
---------------------------------------	---

Background

Pre-TIP Study Overview	1
History of Transportation Planning in Boone, Watauga County	2

Part 1: Purpose and Need

1.1 Introduction	5
1.2 Summary of Need	5
1.3 Summary of Purpose	6
1.4 Background Information/ Area Description	6
1.5 Roadway Conditions	
1.5.1 Existing Characteristics	7
1.5.2 Existing Conditions	10
1.5.3 Projected Conditions	11
1.6 Safety Analysis	13
1.7 System Linkages	
1.7.1 Existing Road Networks	14
1.7.2 Transportation Plans	15
1.7.3 Modal Interrelationships	17
1.8 Social & Economic Conditions	
1.8.1 Demographics	17
1.8.2 Economic Data	18
1.8.3 Land Development Plan	19
1.8.4 Other Issues	20

Part 2: Alternatives Analysis

2.1 Description of Corridor Alternatives	31
2.2 Analysis of Corridor Alternatives	33
2.2.1 Summary of Information Developed and Meetings/ Outreach .	33
2.2.2 Benefits and Impacts Assessment	34
2.2.3 Widening and New Location Corridor Alternatives Eliminated from Further Consideration	39
2.2.4 Other Types of Alternatives Eliminated from Further Consideration	40
2.2.5 Summary of Analysis	41
2.3 Alternatives to be Carried Forward for Detailed Study	42

This Page Intentionally Left Blank

LIST OF APPENDICES

Appendix A: Thoroughfare Plans	A-1
Appendix B: Merger Team Meeting Summaries	B-1
Appendix C: Concurrence on Purpose and Need.....	C-1
Appendix D: Concurrence on Detailed Study Alternatives	D-1
Appendix E: Local/ Public Involvement	E-1

LIST OF FIGURES

Figure 1: Geographic Location of Boone, Watauga County	21
Figure 2: Traffic Origins and Destinations	23
Figure 3: Study Area Boundary.....	25
Figure 4: Projected Capacity Deficiencies	27
Figure 5: Travel Desire Patterns	29
Figure 6: Corridor Alternatives (November 17, 2003).....	47
Figure 6b: Corridor Alternatives & Environmental Data.....	49
Figure 6c: Corridor Alternatives (1000-ft Study Corridors).....	51
Figure 7: Corridor Alternatives to Study Further (February 11, 2005).....	53
Figure 7b: Corridor Alternatives & Environmental Data.....	55
Figure 7c: Corridor Alternatives (1000-ft Study Corridors).....	57

This Page Intentionally Left Blank

Background

Pre-TIP Study Overview

This report documents the Pre-TIP Study of proposed improvements to US 421 in the vicinity of Boone, Watauga County. The Pre-TIP Planning Process follows the National Environmental Policy Act (NEPA)/ Section 404 of the Clean Water Act Interagency Merger Process.

The NEPA/ Section 404 Merger Process combines the regulatory requirements of Section 404 of the Clean Water Act with the NEPA decision making process for transportation projects in North Carolina. It is conducted in accordance with NEPA and follows Council on Environmental Quality (CEQ) and Federal Highway Administration (FHWA) guidelines. The NEPA/ Section 404 Merger Process is conducted by a Merger Project Team, who reaches concurrence on strategic project decision points in the project development process.

The Merger Project Team is led by the North Carolina Department of Transportation (NCDOT), FHWA, and the US Army Corps of Engineers (USACOE). Other cooperating agencies include US Fish and Wildlife (USFWS), NC Division of Natural and Environmental Resources (DENR), NC Division of Water Quality (DWQ), NC Wildlife Resources Commission (WRC), and NC State Historic Preservation Office (SHPO). The local community is represented on the Merger Project Team by the staff from the planning organization in the area, and by NCDOT.

Of the various concurrence points in the NEPA/ Section 404 Merger Process, the Pre-TIP Planning Process covers the first two concurrence points. The first concurrence point is the Purpose and Need for the proposed improvement. The second concurrence point is the Alternatives to be Carried Forward for Detailed Study. The Pre-TIP Planning Process enables the Merger Project Team to reach concurrence on these first two points prior to the proposed improvements being funded in the Transportation Improvement Program (TIP).

The primary outcomes of the Pre-TIP Study are a formal statement of the Purpose and Need for the proposed improvements and information on a full range of options, which are reduced to those Alternatives to be Carried Forward for Detailed Study. The Alternatives to be Carried Forward for Detailed Study are selected based on meeting the purpose and need for the improvement, providing the needed traffic benefits while minimizing impacts to the human and natural environment, and public input.

After the Pre-TIP Study, the project must be funded in the TIP before it can proceed through the remainder of the NEPA/ Section 404 Merger Process. The remainder of

the process will continue to include coordination with other agencies and local governments, including additional opportunities for public input. The NEPA study will ultimately result in the final selection of a corridor, which will be documented in an Environmental Impact Statement. After a final corridor is selected, the NCDOT Roadway Design Branch will develop the final design for the facility and the NCDOT Right of Way Branch will work with affected property owners. Throughout this project development process, there are many opportunities for public input.

History of Transportation Planning for Boone, Watauga County

Prior to this Pre-TIP Study of US 421 in Boone, transportation studies have been conducted for Boone and Watauga County by the NCDOT Transportation Planning Branch (TPB) and the local communities. These transportation studies resulted in Thoroughfare Plans that document needed transportation improvements over a 20-25 year period. These plans, which are regularly updated, are mutually adopted by the local governing body and the NCDOT's Board of Transportation on behalf of NCDOT. The Thoroughfare Plan for Boone was developed in 1964 and updated in 1979 and 1991. The Watauga County Thoroughfare Plan was originally developed in 1981, adopted in 1989, revised in 1993 as part the multi-county 'Region D' plan, and revised in 2002. (Refer to Appendix A: Thoroughfare Plans).

Proposals to improve US 421 in the vicinity of Boone, Watauga County have been on the Boone Thoroughfare Plan since the 1970s. The Watauga County Thoroughfare Plans have also included recommendations to improve US 421 in the county outside of the Boone area. The proposal in the Boone and Watauga County thoroughfare plans is to widen US 421 in the county outside of the Boone urban area and to reroute US 421 from King Street to a new facility on new location in the vicinity of Boone.

The most recent update of the Boone Thoroughfare Plan by NCDOT's Transportation Planning Branch and the Town of Boone was in 1991. Then, in 1995, the Boone Town Council requested that NCDOT further study the proposal to reroute US 421 in the vicinity of Boone.

NCDOT began a preliminary environmental review, called a Phased Environmental Analysis. Initially, NCDOT and the local area proceeded in studying approximately six new alternatives. All of the alternatives were for a facility on new location from NC 105 at NC 105 Bypass to US 421 east of Boone. These alternatives assumed that NC 105 Bypass would be used, with possible future upgrades, to complete the connection back to US 421 west of Boone.

The Phased Environmental Analysis of the new location alternatives included documentation of the need for improvements, analysis of traffic accident data,

functional designs, right of way and construction cost estimates, and quantification of impacts to residents, businesses, and natural resources. Coordination efforts included meetings with local officials and a Public Information Workshop in 1997. NCDOT also coordinated with state and federal resource agencies. In 1998, these agencies provided NCDOT informal comments on the feasibility and environmental impacts of the alternatives. The Phased Environmental Analysis resulted in information on the benefits and impacts of multiple alternatives.

In November of 1999, NCDOT met with the Boone Town Council to review the previously proposed alternatives and to begin analyzing modifications needed to develop a preferred long-range planning corridor for the Thoroughfare Plan. In December of 1999, local core partners approved the concept of forming a community-based task force to study the proposals. The Transportation Task Force core partners were the Town of Boone, Watauga County, Appalachian State University, and the Boone Area Chamber of Commerce. In addition to representatives from each of these partners, the Transportation Task Force included individual community members not affiliated with any of the core partners.

Over the course of a year, the Transportation Task Force held regular meetings, usually twice a month, to further study transportation issues in the area. The task force's consensus was that there was a need for rerouting US 421 on new location and they would work to develop a new alternative. NCDOT representatives worked closely with the task force to provide transportation data, answer questions, and assist in the development of a modified corridor. On October 3, 2000, the Transportation Task Force presented its preliminary recommendation in a public forum.

After receiving and responding to public comments, the Transportation Task Force made its final recommendation to the governing bodies of its core partners for their endorsement. This final recommendation included a concept for the type of improvements desired, in addition to a new corridor alternative to be studied. The Task Force's concept for the rerouting of US 421 was for a facility with beautification enhancements and scenic features, which they proposed naming the 'Daniel Boone Parkway'. The Appalachian State University Board of Trustees and the Board of Directors of the Boone Area Chamber of Commerce endorsed the concept of the Daniel Boone Parkway in Resolutions of Support on December 1, 2000, and February 6, 2001, respectively. On March 15, 2001, the Board of Directors of the North Carolina High Country Host also adopted a Resolution of Support, similar to those adopted by Appalachian State University and the Boone Area Chamber of Commerce.

In response to a presentation of the Transportation Task Force recommendation on February 22, 2001, the Boone Town Council unanimously voted to receive the Task Force's recommendation and to request that NCDOT continue with the study of all

alternatives, including the Transportation Task Force's proposed corridor. (Refer to Appendix E for the Study Request from the Town of Boone and the Task Force Recommendation). On April 16, 2001, NCDOT representatives presented an overview to the Boone Town Council of further analysis that would be conducted for the proposal to reroute US 421.

Over the course of the following year, NCDOT continued to work with local representatives and various agencies to compile information to analyze the various alternatives. During this time NCDOT also met with local groups upon request, such as the Boone Town Council, the Watauga County Board of Commissioners, Watauga Citizens for Better Transportation, and Watauga Leadership Challenge sponsored by the Boone Area Chamber of Commerce.

In February of 2002, the North Carolina Department of Transportation announced that the proposed improvements to US 421 in Boone would be studied through the Pre-TIP Planning Process. The results of the Pre-TIP Study, including coordination with agencies and public involvement, are documented in this report.

PART 1: PURPOSE AND NEED

1.1 Introduction

This Purpose and Need document is being prepared in accordance with NEPA and its content will conform to Council on Environmental Quality (CEQ) and Federal Highway Administration (FHWA) guidelines. The lead coordinating agencies in the development of this document have been the North Carolina Department of Transportation (NCDOT), FHWA, and the US Army Corps of Engineers (USACOE). Other cooperating agencies include US Fish and Wildlife Service (USFWS), NC Division of Natural and Environmental Resources (DENR), NC Division of Water Quality (DWQ), NC Wildlife Resources Commission (WRC), and NC State Historic Preservation Office (SHPO). Note that this section of the report is dated February 2003, and was not updated when the report was finalized in August 2008, because it documents the information the Merger Project Team had at the time they reached concurrence on Purpose and Need.

1.2 Summary of Need

MOBILITY

US 421 in the vicinity of Boone is routed along King Street, the primary downtown corridor. This portion of US 421 (King Street) is currently experiencing congestion that will worsen in the future. The congestion that exists is due to the mixed use of US 421 (King Street) by local traffic with destinations to downtown Boone, and through traffic using US 421, US 321/221, and NC 105.

Significant portions of the through traffic using US 421 are actually trying to access US 321/221 south and NC 105 west. Because no direct connections exist between US 421, US 321, and NC 105, this through traffic is funneled into downtown Boone along King Street. To reach its destinations, this traffic is forced to make turns at the intersections of US 421 with US 321 (Blowing Rock Road) and US 221/ NC 105 Extension, as well as the intersection of US 321 (Blowing Rock Road) with NC 105.

Currently, the volume of traffic on US 421 and these other major facilities is near or exceeding the capacity of the road to provide an acceptable level of service. If no improvements are made, traffic projections in 2020 indicate that US 421 and the other major facilities will be over capacity by 20% to more than 75%. Refer to Section 1.5.2 for data on existing conditions and Section 1.5.3 for future projections.

SAFETY

In addition to mobility problems, the combination of local and through traffic on US 421 (King Street) and the other facilities also creates safety issues. Through traffic is characterized by higher speeds and percentage of trucks, while local traffic is slower moving with the need to make frequent turning, parking, or stopping moves. Ideally,

transportation facilities are designed such that through traffic and local traffic are served by separate roads. The need for safety improvements is evidenced by current accident rates along US 421 (King Street) and the other major facilities, which are higher than the statewide average. Refer to Section 1.6 for the Safety Analysis.

1.3 Summary of Purpose

The mobility and safety problems that exist along US 421 (King Street) in the vicinity of Boone can be improved if the through traffic using the facility is separated from the local traffic. Since a significant portion of this through traffic is using US 421 (King Street) to access US 321/221 south and NC 105 west, direct connections to these facilities would eliminate the circuitous route through Boone that is currently the only option and reduce congestion on all of these major facilities.

Improvements to US 421 in the vicinity of Boone should serve the following purpose:

- Reduce the mixed use of US 421 (King Street) through downtown Boone by local and through traffic
- Improve system linkage for US 421 and the other major facilities
- Improve traffic flow along US 421 and the other major facilities
- Improve safety along US 421

1.4 Background Information/ Area Description

LOCATION

Watauga County is located in the northwestern part of North Carolina. Watauga County has approximately 312 square miles of land area, with elevations ranging from 2,000 to 6,000 feet above sea level. Watauga County's population was approximately 42,700 in 2000. Located in the Appalachian Mountains, the Town of Boone encompasses approximately 4 square miles of land area, with an average elevation of 3,333 feet above sea level. Boone is the County seat and its largest municipality, with a population of approximately 13,500 in 2000.

- ***Refer to Figure 1: Location of Boone, Watauga County***

HISTORY

NCDOT has assisted the Town of Boone and Watauga County with Transportation Planning since the 1960s. Most recently, NCDOT and the Town of Boone updated the 1976 Boone Thoroughfare Plan in 1991. Watauga County was part of the 1993 Region D Thoroughfare Plan, then developed an updated individual Thoroughfare Plan with the assistance of NCDOT in 2002. Refer to Section 1.7.2 and Appendix A: Thoroughfare Plans for more information on the transportation planning conducted in Boone and Watauga County.

1.5 Roadway Conditions

1.5.1 Existing Characteristics

FIVE MAJOR FACILITIES

Boone serves as the junction for five major facilities in western North Carolina. These facilities serve a variety of traffic purposes. US 421 is a major facility in the north-western part of the state. US 221, US 321, NC 105, and NC 194 all feed into this facility in the vicinity of Boone. Each of these facilities is a major thoroughfare, carrying significant volumes of through traffic (*traffic going from one destination to another outside of Boone*) and local traffic (*traffic with destinations in Boone*). In the Boone area, truck traffic is currently routed along US 421 (King Street) only east of the NC 105 intersection, and then is routed along US 321/ 221 and NC 105.

These five facilities run concurrent and intersect in several places in Boone. US 421 is currently routed along King Street through downtown Boone. US 421 (King Street) is also signed as US 321, US 221, and NC 194 in various locations. One high-volume intersection along US 421 (King Street) is its intersection with NC 105 Extension/ US 221. Additionally, US 321, US 221, and NC 105 come together at a heavily congested intersection south of US 421 (King Street). Refer to Sections 1.5.2 and 1.5.3 for more information on the existing and projected congestion on these major facilities.

US 421 (KING ST) FEATURES

US 421 is currently routed along King Street through downtown Boone. King Street is characterized by very dense commercial development. Some sections have traditional storefronts on both sides of the street with sidewalks. There is no access control, resulting in numerous intersecting streets and driveways that directly connect to King Street. On-street parking is provided for customers of the numerous businesses along the street. The type of parking provided varies along the facility in two respects: one and both sides of the street and parallel and angled spaces.

The cross-section of US 421 (King Street) also varies along the facility. From NC 105 Bypass to NC 105 Extension/ US 221, which is approximately 3 miles, the cross-section is two lanes and the speed varies from 45 to 20 mph. From NC 105 Extension/ US 221 to the relocation of US 421 (TIP Project R-529), which is approximately two miles, the cross-section varies from two lanes to four or five lanes and the speed limit varies from 35 to 45 mph. Of the numerous intersections along US 421 from NC 105 Bypass to the relocation of US 421 (TIP Project R-529), approximately 12 are signalized and have exclusive turn lanes.

FUNCTIONAL CLASSIFICATION

Roads are classified by FHWA's Highway Functional Classification System, which distinguishes public roads by the service they provide. Arterials are the highest level of classification, with collectors and local facilities being the lower

classifications. The higher classifications, such as arterials, are intended to provide primarily for mobility and the lower classifications, such as locals, are intended to provide access to property. Arterials are subdivided into principal arterials and minor arterials. Principal arterials include interstates, other freeways and expressways, and other principal arterials.

US 421 (King Street) has a federal functional classification of other principal arterial. US 321 (Blowing Rock Road), US 221/ NC 105 Extension, and NC 105 are also other principal arterials and US 321 from US 421 to NC 105 is a minor arterial.

Arterials are intended to provide the highest level of mobility, at the highest speed, for long, uninterrupted travel. Arterials generally have higher design standards than other roads, often with multiple lanes and some degree of access control. US 421 (King Street) does not currently meet these standards. As discussed previously, it does not have multiple lanes or access control. The capacity of the facility to handle a certain volume of traffic is reduced due to the lack of access control and the presence of on street parking.

The development along King Street prevents it from adequately providing for the high speed, long, uninterrupted travel that is needed for US 421. Because the corridor is densely developed, King Street is serving local travel needs by providing access to the development. In addition, because it is signed US 421, through traffic is using it as well. Therefore, US 421 (King Street) is currently trying to serve two very distinct needs, local traffic with destinations along King Street and through traffic using US 421. For safe and efficient operation, roads are typically planned and designed to serve primarily one function, either access to development/ local travel or mobility/ through travel. In the case of US 421 (King Street), local and through travel are combined on this single facility.

- ***Refer to Figure 2: ‘Traffic Origins and Destinations’***

THROUGH TRAFFIC

Travelers going through Boone that constitute ‘through traffic’ have a variety of origins and destinations (*starting and ending points in their trips*). Generally, through traffic is defined as travel that originates outside of the local area and has destinations outside of the area, without any stop within the area. For this study, the study area boundary approximately corresponds with what is being defined as the local area.

- ***Refer to Figure 3: ‘Study Area Boundary’***

US 421, as well as US 221, US 321, and NC 105 are designated as part of North Carolina’s Intrastate System (GS 136-79, refer to Section 1.8.4 for more details on the Intrastate System). As part of the Intrastate System, each of these facilities are designated to be upgraded in order to provide “safe, high speed

travel”. These facilities serve some critical local travel needs, but their primary function is to provide adequately for through traffic.

One type of through traffic in the vicinity of Boone is travel with east-west origins and destinations. US 421 carries a significant amount of this type of through traffic, linking Deep Gap and Winston-Salem to the east, with the western-most parts of North Carolina and eastern Tennessee. In addition to through travel on US 421, other facilities in Boone, such as NC 105, serve as access for skiers traveling to the four major ski resorts west of Boone, and for tourists traveling to Grandfather Mountain, Linville Falls, and a variety of other popular area tourist destinations.

Another significant component of through traffic is travel between Blowing Rock, south of Boone, and destinations to the east or the west on US 421. Travel between southern and eastern destinations, such as Deep Gap or Winston-Salem, use US 321 (Blowing Rock Road) and US 221/ NC 105 Extension to access US 421 east. Through travel between Blowing Rock and destinations to the west primarily use US 321 (Blowing Rock Road), NC 105, and NC 105 Bypass to access US 421 to the west.

In summary, there are three major types of through travel in the area: through traffic on US 421, between US 421 east and US 321 south, and between US 421/ NC 105 west and US 321 south. These types of through travel could be served by providing direct links between US 421 east, US 321 south, and NC 105/ US 421 west, relieving congestion from the roads they are currently using.

Through travel in the vicinity in Boone has also created a ‘default bypasses’ on some local roads in the area. Due to congestion on US 421 (King Street), and other facilities, some traffic uses Bamboo Road (SR 1514), Wilson Ridge Road (SR 1522), Deerfield Road (SR 1523), and other local roads. These facilities are designed to serve local traffic and to provide access to adjacent properties. However, they are currently being forced to provide for through travel in addition to their intended local use.

LOCAL TRAFFIC

Local travel is also a significant component of the traffic using the major facilities in the vicinity of Boone. Local traffic is defined as travel that, whether starting outside of the local area or within the local area, has a destination in Boone. Refer to Figure 3 for depiction of the study area boundary, which is approximately what is referred to as the local area.

Boone is an important local destination in western North Carolina. Tourism has a significant impact on traffic in the area. Tourism is heavy in three seasons (summer, fall, and winter) and many destinations in Boone attract visitors throughout the year.

Boone is the home of Appalachian State University (ASU), a university with over 15,000 students and faculty. There are 7,200 vehicles registered to students, faculty, and staff. Many of the university's peak attractions, such as football games, occur at the same time as the fall tourism season. University enrollment is expected to increase, since enrollment applications increase annually.

Other significant destinations include the various shopping locations in the area. Boone's downtown shopping area is along King Street, which is currently signed as US 421. As noted previously, King Street is currently a two-lane facility with very dense commercial development and numerous driveways. On street parking is provided for customers of the numerous businesses, in some areas on both sides of the street. The ease and safety with which local traffic can access this downtown area is a concern, given the congestion on King Street and the use of the facility by US 421 through traffic.

In addition to US 421 (King Street), US 321 (Blowing Rock Road) to the south and NC 105 to the west also have a significant amount of commercial development. Like US 421, both of these facilities have no access control, resulting in numerous intersecting streets and driveways that connect directly to the facilities. Each of these facilities is also currently being forced to serve two distinct needs, through travel and local travel, which ideally would be separated. Providing direct connections between US 421, US 321, and NC 105 would serve the local traffic to these commercial areas.

1.5.2 Existing Conditions

EXISTING CAPACITY DEFICIENCIES

To determine how well a facility is operating, current average daily traffic volumes can be compared to the capacity of the current cross-section of the facility. Capacity for Level of Service (LOS) D is considered the practical capacity of a facility, or that level of congestion at which users perceive conditions to be intolerable. If volumes exceed LOS D, the facility is said to be 'over capacity' and a 'capacity deficiency' exists. When a road is over capacity, a LOS of E or F is being provided, which is considered unacceptable and signals the need for improvements. New facilities are generally designed to provide a minimum of a LOS C. For more information on LOS designations, refer to the Highway Capacity Manual.

All five major facilities in the vicinity of Boone are currently heavily traveled. US 421 is currently routed along King Street, a 2-lane facility except for a 4 to 5-lane section east of Boone, with a posted speed limit that varies from 20 to 45 mph. Refer to Section 1.5.1 for further details on the existing cross-section.

According to 2001 annual average daily traffic counts (AADT), the traffic on US 421 varies from 9,500 to 22,000 vehicles per day (vpd). The current cross section of US 421 has enough capacity to provide a LOS D for 8,400 to 10,900 vpd in the 2-lane sections, and 17,600 to 24,900 vpd in the 4 to 5-lane sections.

This indicates that current traffic volumes are already near or exceeding the capacity of US 421 for the entire length of the facility through the area, except the multi-lane section east of Boone.

US 321/221 also has traffic volumes that are close to or over its capacity. From north of NC 105 to the southern Boone town limits, volumes are 13,000 to 32,000 vpd compared to a capacity of 23,300 vpd for its 5-lane cross-section.

NC 105 and NC 105 Extension/US 221 are currently over capacity, with volumes of 25,000 to 29,000 vpd compared to a 5-lane capacity of 23,300 vpd. NC 194 is slightly over capacity just north of US 421, with a traffic volume of 8,900 vpd and capacity for its 2-lane cross-section of 8,400 vpd. Figure 4 shows the existing traffic volumes for all the major facilities in the vicinity of Boone.

- ***Refer to Figure 4: ‘Capacity Deficiencies’***

EXISTING TRAVEL PATTERNS

In addition to examining the current capacity deficiencies of major facilities in the vicinity of Boone, it is useful to know what the desired travel patterns are in the area. A travel demand model is used to approximate what travel patterns exist, as well as to project travel volumes in the future. Travel demand models are based on existing and projected land use, and are calibrated to existing traffic volumes. For the Boone area, the travel demand model originally developed as part of the 1991 Thoroughfare Plan update is used. It was updated in 1998 with the addition of revised land use projections, provided by the town planning staff.

Travel patterns for through traffic are analyzed for the five major facilities in the area. Specifically, the analysis is conducted at a location on each facility near the perimeter of the local study area, as shown in Figure 5. The five locations considered are: US 421/ US 221 east, US 321/ US 221 south, NC 105 west, US 421/ US 321 west, and NC 194 north of Boone.

Of the total traffic on each of the five major facilities (except NC 194), approximately 34% to 38% is through traffic. The largest components of the through traffic are between US 421/ US 221 east and US 421/ US 321 west and between US 421/ US 321 west and US 321/ US 221 south. The next largest components are between US 421/ US 221 east and NC 105 west and between US 321/ US 221 south and NC 105 west. This analysis of the travel desire patterns indicates that the need to serve travel between US 421 and US 321 south and between US 421 and NC 105 west is as significant as the travel on US 421 through the area.

1.5.3 Projected Conditions

FUTURE CAPACITY DEFICIENCIES

As described in Section 1.5.2, a local travel demand model is used to project traffic volumes to the future, in this case to the year 2020. These projected average daily traffic volumes can also be compared to the capacity of the current

cross-section of the five major facilities in the area. The existing traffic volumes on these facilities were shown to be near or over the capacity currently provided. For each facility, traffic projections show that these conditions will worsen by the year 2020.

According to 2020 traffic projections, the traffic on US 421 will range from 17,500 to 36,200 vehicles per day (vpd). The current cross section of US 421 has enough capacity to provide a LOS D for 8,400 to 10,900 vpd in the 2-lane sections and 17,600 to 24,900 vpd in the 4 to 5-lane sections. This indicates that future traffic volumes will exceed the capacity of US 421 by 20% to over 75% for the entire length of the facility through the area, except the multi-lane section east of Boone.

US 321/221 will also exceed its capacity by 2020. From north of NC 105 to the southern Boone town limits, projected volumes are 33,100 to 45,400 vpd exceed the capacity of 23,300 vpd by 40% to 90%.

NC 105 and NC 105 Extension/US 221 are expected to exceed capacity by 40% to over 100%, with volumes of 32,400 to 45,900 vpd compared to capacity of 23,300 vpd. NC 194 north of US 421 is also expected to exceed capacity with a projected traffic volume of 26,700 vpd and capacity of 8,400 vpd. Figure 4 shows the existing and future traffic volumes for all the major facilities in the vicinity of Boone, as well as the percent by which each route's capacity is exceeded by 2020.

FUTURE TRAVEL PATTERNS

The future desired travel patterns in the area are expected to be similar to those that currently exist. As for the existing travel patterns, data is given for five points near the perimeter of the local study area, US 421/ US 221 east, US 321/ US 221 south, NC 105 west, US 421/ US 321 west, and NC 194 north of Boone.

Through travel is expected to remain a significant component of the total traffic, with volumes increasing. In addition to typical growth, this increase is expected due to improvements currently being made to the US 421 corridor from Boone east to Winston-Salem, which will improve the ease of travel to Boone.

Of the total traffic on each of the five major facilities (except NC 194), approximately 34% to 42% is through traffic. The largest components of the through traffic are expected to remain between US 421/ US 221 east and US 421/US 321 west, and between US 421/US 321 west and US 321/ US 221 south. The next largest components are between US 421/ US 221 east and NC 105 west and between US 321/ US 221 south and NC 105 west. This analysis of the travel desire patterns indicates that the need to serve travel from US 421 to US 321 south and to NC 105 west will remain in the future as significant as the travel on US 421 through the area. Refer to Figure 5 for

depiction of these travel patterns. Note that Figure 5 shows only through traffic estimates; for total traffic volumes refer to Figure 4.

- ***Refer to Figure 5: 'Travel Desire Patterns'***

1.6 Safety Analysis

Crash rates on US 421(King Street) in the vicinity of Boone are currently significantly higher than the average rate for North Carolina. Over the last three years, from May of 1999 to April of 2002, there were 566 reported crashes on US 421 (King Street) from NC 105 Bypass west of Boone to Bamboo Road (SR 1514) east of Boone. This corresponds to 701.2 crashes for every 100 million vehicle miles traveled along US 421 compared to an average rate of 211.4 crashes per 100 million vehicle miles along other US routes statewide.

As described in Section 1.5.1, significant portions of the traffic that is using US 421 (King Street) is making connections to US 321 to travel south and NC 105 to travel west. Therefore, crash rates at the other major facilities in the vicinity of Boone are also relevant. Intersections of US 421 (King Street) with other major roads such as NC 105 Bypass, US 321 (Blowing Rock Road), US 221/ NC 105 Extension, and NC 194 currently have accident rates that range from 22.5 to 35.1 accidents per 100 million vehicles entering the intersections, or from approximately 24 to 110 accidents per year.

In addition to their intersections with US 421 (King Street), many of these facilities also experience higher than average crash rates along their routes away from their intersection with US 421. For example, US 321 (Blowing Rock Road) has a crash rate of 525.2 accidents per 100 million vehicle miles traveled, compared to the statewide average rate of 211.4.

The crash rates along US 421 (King Street), as well as the other major facilities in the area, can be decreased through several traffic management strategies. First, reducing congestion on these facilities will likely reduce the number of crashes that occur. Even if the crash rate remains the same, a lower number of vehicles using the facilities will reduce the conflict potential.

In addition to reducing congestion, there are other transportation strategies that can reduce potential for accidents. Separation of local traffic from through traffic would eliminate the conflict between slower moving vehicles that have destinations in the area and vehicles traveling at higher speeds through the area. If through traffic is separated from local traffic, then the number of trucks in the vehicle mix with local travelers would also be reduced, reducing the accident potential. Further, if the through traffic is separated from local traffic by providing an alternative facility, that facility is likely to

have a lower accident rate because it would be designed to higher standards and have greater control of access.

Pedestrian use of US 421 (King Street) is an important component of safety to consider. As described previously, US 421 is currently routed along King Street through downtown Boone. There is significant pedestrian travel along this local facility, in part due to the location of the University nearby. The transportation strategies described in this section would also serve to improve pedestrian safety, by reducing congestion and removing high speed through traffic from this downtown facility.

Another safety consideration, in examining the need for transportation improvements in the vicinity of Boone, is ability of emergency vehicles to service the area. Reducing congestion along US 421 (King Street) and other major facilities could decrease the travel times of emergency vehicles. These emergency response times could further be reduced by providing direct connections between US 421 and other major facilities, such as US 321 and NC 105.

1.7 System Linkages

1.7.1 Existing Road Networks

NATIONAL HIGHWAY SYSTEM

As described in Section 1.5.1, Boone serves as the juncture for several major facilities, including US 421, US 321, US 221, and NC 105. Each of these facilities is designated as part of the National Highway System (NHS) as a functionally classified ‘other principal arterial’. The NHS was established in 1991 by the Intermodal Surface Transportation Efficiency Act (ISTEA). The NHS identifies roadways that serve major population centers, intermodal transportation facilities, national defense, and interregional travel. While this system comprises only 4% of the public roadways in the Nation, it carries approximately 40% of the vehicle miles travel (VMT) and approximately 70% of all truck traffic. The NHS designates key facilities that are critical for travel and should be maintained and improved to meet travel needs adequately.

US 421, as well as US 221, US 321, and NC 105, are also designated as part of North Carolina’s Intrastate System (G.S. 136-79). This designation means these facilities have been identified for improvements so that they provide “safe, high speed travel.” (Refer to Section 1.8.4 for more details on the Intrastate System).

SYSTEM LINKAGES

As explained previously, US 421, US 321, US 221, and NC 105 all intersect in Boone. Traffic on these major facilities is routed into Boone, often on circuitous routes. Because certain direct system linkages are not currently provided, the overall miles vehicles must travel is higher and local streets are more congested.

In addition to the through traffic that uses US 421, there are significant amounts of through traffic with other origins and destinations. As described in Section 1.5.1, through travel between US 421 east of Boone and US 321 south of Boone is significant. Another sizable component of through traffic is between US 421 and NC 105 west of Boone and US 321 south of Boone. Critical system linkages could be provided by direct connections between US 421, US 321, and NC 105. (Refer to Section 1.5.3 for specific information on through travel).

1.7.2 Transportation Plans

THOROUGH- FARE PLANS

Both Watauga County and the Town of Boone have worked cooperatively with NCDOT on long-range transportation planning, as required by North Carolina's General Statutes 136-66.2. Both the Town and County Thoroughfare Plans are the result of a cooperative effort between the local governing bodies and NCDOT. The development process for both plans includes efforts to solicit input from the public and adoption of the plans only occurs after public hearings. The Town of Boone and Watauga County, with the assistance of NCDOT, have sought to address the needs described in this document, as well as others, in their Thoroughfare Plans, which are included in Appendix A. Refer to the separate documentation of these Thoroughfare Plans, available from the town, county, and NCDOT, for more information.

Proposals to improve US 421 in the vicinity of Boone, Watauga County have been on the Boone Thoroughfare Plan since the 1970s. Most recently, NCDOT and the Town of Boone updated of the 1976 Boone Thoroughfare Plan in 1991. Watauga County's long-range transportation planning has previously been part of the 1993 Region D Thoroughfare Plan, which included a seven county area in northwestern North Carolina. Based on a request from Watauga County, the NCDOT TPB Branch has worked with the County to develop a new Watauga County Thoroughfare Plan in 2002. The current Watauga County Thoroughfare Plan includes recommendations to improve US 421 to a 4-lane facility outside the Boone area and the current Boone Thoroughfare Plan recommends US 421 be relocated to a 4-lane new facility on new location in the vicinity of Boone.

US 421 TIP PROJECTS

In response to the Thoroughfare Plan recommendations and requests from the local governing bodies, the proposal to reroute US 421 to new location in the vicinity of Boone is included in the current Transportation Improvement Program (TIP) as unfunded project U-2703. It is important to note that the project is listed as scheduled for environmental review, but the project is not fully funded in the current TIP. The local communities may continue requesting funding for Project U-2703 as part of their biennial priority list requests.

Several other projects included in the TIP are related to the proposal to reroute US 421 to new location in the vicinity of Boone. As mentioned in Section 1.5.1,

US 421 from the Tennessee State Line to I-40 in Winston –Salem (as well as from Greensboro to Sanford) is designated as part of North Carolina’s Intrastate System in state law G.S. 136-179 (refer to Section 1.8.4 for more details on the Intrastate System). As part of the intrastate system, US 421 is identified as needing to be upgraded to at least four travel lanes.

Upgrading US 421 from Boone to Winston-Salem is covered by multiple TIP Projects. The section nearest Boone, TIP Project R-529, covers US 421 from Boone to 2 miles east of US 221 and was completed in 2003. Much of the rest of US 421 is already multiple lanes and the entire section from Boone to Winston-Salem is scheduled to be complete by the end of 2003. Once these projects that are already underway are complete, US 421 from Boone to Winston-Salem will be a 4-lane, access controlled facility with the exception of Wilkesboro, west of Boone, and Boone. US 421 in the vicinity of Wilkesboro is multiple lanes, but the five-lane section is not access controlled, so planning is underway for a facility on new location. US 421 from Boone to the Tennessee state line is covered by unfunded Project R-2615, which is dependent on the plans for US 421 in Boone.

The TIP includes Project U-4020, which proposes to widen US 421 (King Street) to a multi-lane facility from US 221 (NC 105 Extension) to US 321 (Hardin Street). Project U-4020 will address some of the localized congestion issues for this 0.3 mile section of King Street, whereas Project U-2703 is intended to address the regional need to improve the entire US 421 corridor in the vicinity of Boone.

[Addendum after February 2003: The 2006-2012 TIP expanded the scope of Project U-4020 to a 1-mile section from NC 194 (Jefferson Avenue) to US 321 (Hardin Street). This expansion does not affect the Purpose and Need for Project U-2703 since Project U-4020 is still only addressing some of localized congestion for a short section of the corridor. As documented in the Environmental Assessment (EA), dated November 2006, while Project U-4020 is expected to provide some congestion relief along its 1-mile section, volumes continue to exceed capacity even with this project in place. It is further noted in the EA that, “Additional laneage may be necessary, however environmental constraints continue to limit additional improvements.” Therefore, the need to address congestion on US 421 in the vicinity of Boone remains and can not be fully met by Project U-4020. Project U-2703 is a proposal for providing the additional needed congestion relief for this area, as well as the entire 6-mile corridor in the vicinity of Boone.]

US 421 in the vicinity of Boone and to the west are the only remaining section of US 421 to be upgraded. Completing the upgrade of US 421 in Boone and westward will become even more critical as the rest of US 421 to the east of

Boone is completed. The level of service intended to be provided on the entire US 421 corridor can not be accomplished without upgrades in Boone and Watauga County.

OTHER TIP PROJECTS

In addition to US 421, there are plans to upgrade US 321, US 221, and NC 105 as part of North Carolina's Intrastate System. US 321 is scheduled to be widened to multi-lanes from NC 268 in Caldwell County to north of Blowing Rock as part of TIP Project R-2237. Part of Project R-2237 is scheduled for construction in federal fiscal year 2008 and the remainder for after 2008. NC 105 is planned to be widened as part of unfunded TIP Project R-2566, from US 221 in Avery County to NC 105 Bypass (SR 1107) in Boone. US 221 is scheduled to be widened under TIP Project R-2915 to four lanes from US 421 in Watauga County east of Boone to US 221 Business in Jefferson. Part of Project R-2915 is scheduled for construction in federal fiscal year 2008 and the remainder for after 2008. As other links of the intrastate system are completed, the need to upgrade US 421 in the vicinity of Boone (Project U-2703) increases, in order for the entire system to serve travel adequately.

1.7.3 Modal Interrelationships

MASS TRANSIT

AppalCart, a public transportation authority, provides mass transit services in the vicinity of Boone. The service area includes Boone, Watauga County, and Appalachian State University. AppalCart provides fixed route bus service in the Boone area, and demand response van service throughout the county under contract with human service agencies.

AIRPORTS

There are no commercial airports in the immediate vicinity of Boone. There is a private facility, Boone Airport, located off of Bamboo Road (SR 1514). The closest other airports are in Ashe County, Morganton, Hickory, and Johnston City, Tennessee, which are all within 60 miles of Boone.

BICYCLE & PEDESTRIAN FACILITIES

Local bicycle and pedestrian facilities, as well as transit expansion plans, are addressed in the Boone/ Blowing Rock Alternative Transportation Plan, which was adopted by the Boone Town Council in 1995. Most types of improvements to US 421 will not preclude any of the plans to expand bicycle, pedestrian, and transit facilities. For example, the thoroughfare plan proposal to reroute US 421 would enhance the use of pedestrian, bicycle, and transit facilities on and along existing roads by reducing traffic congestion.

1.8 Social and Economic Conditions

1.8.1 Demographics

POPULATION

In 2000, Watauga County's population was approximately 42,700, a 15.5 percent increase from 1990, which ranks the County 56th in the state for total population. Boone is the County's largest municipality, with a population of

approximately 13,500 in 2000, a 4.0 percent increase from 1990. This data can be compared to North Carolina's total population of approximately 8,049,300 in 2000, a 21.4 percent increase from 1990.

CIVIL
RIGHTS ACT
– TITLE VI

In compliance with Title VI of the Civil Rights Act of 1964 and Executive Order 12898, impacts to minority and low-income populations will be identified and addressed, as appropriate.

Advertisement for all public meetings during this study and the remainder of the NEPA process will be as comprehensive as possible, including strategies such as articles and notices in the local newspapers, local government cable televisions, and radio station public announcements. This type of advertisement strategy seeks to reach all sectors of the community. (Refer to Appendix E: Local/ Public Involvement).

1.8.2 Economic Data

ECONOMIC
BASE

In 2002-2003 Watauga County's average monthly unemployment rate was approximately 3.0%, compared to the state's average rate of 6.0%. The County is ranked 46th in the state for average per capita personal income, at approximately \$22,122 in 1999. The median family income in 2001 is \$40,500. Watauga County's local economy continues to perform better than the average for most other areas in North Carolina. As the area continues to grow, the need for improvements to the local transportation network increases.

Watauga County's largest industries by workforce are in the categories of retail trade, service, and government, constituting approximately 28.7%, 27.8%, and 22.1%, respectively, for the third quarter of 2000. Tourism is the largest industry in Watauga County. Appalachian State University (ASU) is the single largest employer in the Town of Boone, with approximately 2,200 faculty and staff employees. Many of the County's largest manufacturers are located in Boone, producing electrical, textile, wood, leather, food, and metal products. In addition to tourism, education, and manufacturing sectors, medical and financial services, as well as agriculture and forest products contribute to the economy.

TOURISM

Tourism, as the largest industry in Watauga County, significantly impacts the economy in Boone. In 2000 Watauga County ranked 16th out of North Carolina's 100 counties for tourism expenditures, at approximately \$152 million. Many destinations in Boone attract visitors throughout the year, with three seasons constituting the largest portion. Summer is the heaviest season for tourism and the fall leaf season is the second biggest. The third largest winter ski season is also strong. Based on occupancy tax rates from the Boone Convention and Visitor Bureau, the tourism industry has been steadily increasing for the 13 years that the Bureau has tracked the statistics. The tourism sector of the economy has increase more than 6% annually since 1989. Tourism is expected

to continue to increase in the future, especially since major improvements are planned for many routes into the area. (Refer to Section 1.7.2 for specific information on planned transportation improvements).

The retail destinations in Boone are important for residents and tourists. Boone's downtown shopping area is along King Street, which is currently US 421. King Street is currently a two-lane facility with very dense commercial development, providing on street parking and numerous points of access at intersections and driveways. In addition to US 421 (King Street), US 321 (Blowing Rock Road) to the south and NC 105 to the west also have a significant amount of commercial development.

1.8.3 Land Development Plan

CURRENT LAND USE

As described in Section 1.8.2, most of the retail and commercial development in Boone are along US 421 (King Street), US 321 (Blowing Rock Road), and NC 105. Additionally, it should be noted that the Boone Mall is located on US 321, south of the intersection with NC 105.

Appalachian State University (ASU) is located southwest of the intersection of US 421 (King Street) and US 321. ASU's campus can be accessed off of US 321 by Rivers Street or off of US 421 (King Street) by College Street, Depot Street, or other intersecting roads. Watauga High School is located on NC 105, west of the intersection with US 321. The Watauga Medical Center and the Boone Golf Club are both located off of US 321 in the southern-most part of the town limits. Additional development is currently occurring in various locations throughout the area, especially along US 321 (Blowing Rock Road). Refer to Figure 2 for locations of various development.

LAND USE PROJECTION

As described in Section 1.5.3, a transportation travel demand model for Boone was developed for the Thoroughfare Plan in 1991, and revised in 1998. This transportation model is utilized in analyzing the existing and future transportation needs of the area, as well as the projected benefits of any proposed improvements. The modeling process utilizes growth projections based on historical growth rates and input from local representatives. Based on the overall growth projection, the local staff, in coordination with NCDOT projects the land use to the modeled future year (2020). The local representatives incorporate the local land use plans into this projection process. Refer to separate documentation, available from the town and NCDOT, for specific information on the transportation model developed for the Boone Thoroughfare Plan.

Improvements to the corridor of US 421 are expected to have positive impacts on the local retail and commercial areas. For example, if through traffic is separated from local traffic, it would result in reduced congestion on the local densely developed corridors, such as existing US 421 (King Street), NC 105, and US 321. Local traffic with destinations at these retail locations would benefit

from safer travel and easier maneuverability in and out of the flow of traffic at driveways and parking locations. Additionally, a direct connection between US 421, US 321, and NC 105 would provide better, more direct access to the commercial areas along US 321 (Blowing Rock Road) and NC 105.

1.8.4 Other Issues

INTRASTATE SYSTEM

US 421 from the Tennessee state line to I-40 (as well as from Greensboro to Sanford) is identified in North Carolina State Law Article 14: North Carolina Highway Trust Fund, Section 136-178,179 as an Intrastate System Project. The purpose of the Intrastate System is “to provide high-speed, safe travel service throughout the State. It connects major population centers both inside and outside the State and provides safe, convenient, through-travel for motorists.”

This state legislation specifies that US 421 in Watauga County shall have at least four travel lanes. Other sections of US 421 from Boone to Winston-Salem are either currently being upgraded or are scheduled for improvements. Completing improvements to US 421 is important for connectivity to the rest of the Intrastate System. In addition to US 421, US 221, US 321, and NC 105 are also designated as part of North Carolina’s Intrastate System in state law and improvements are scheduled or are being planned. Refer to Section 1.7.2 for more information about planned improvements.

GEOGRAPHIC LOCATION OF BOONE NORTH CAROLINA

NOVEMBER 15, 2002

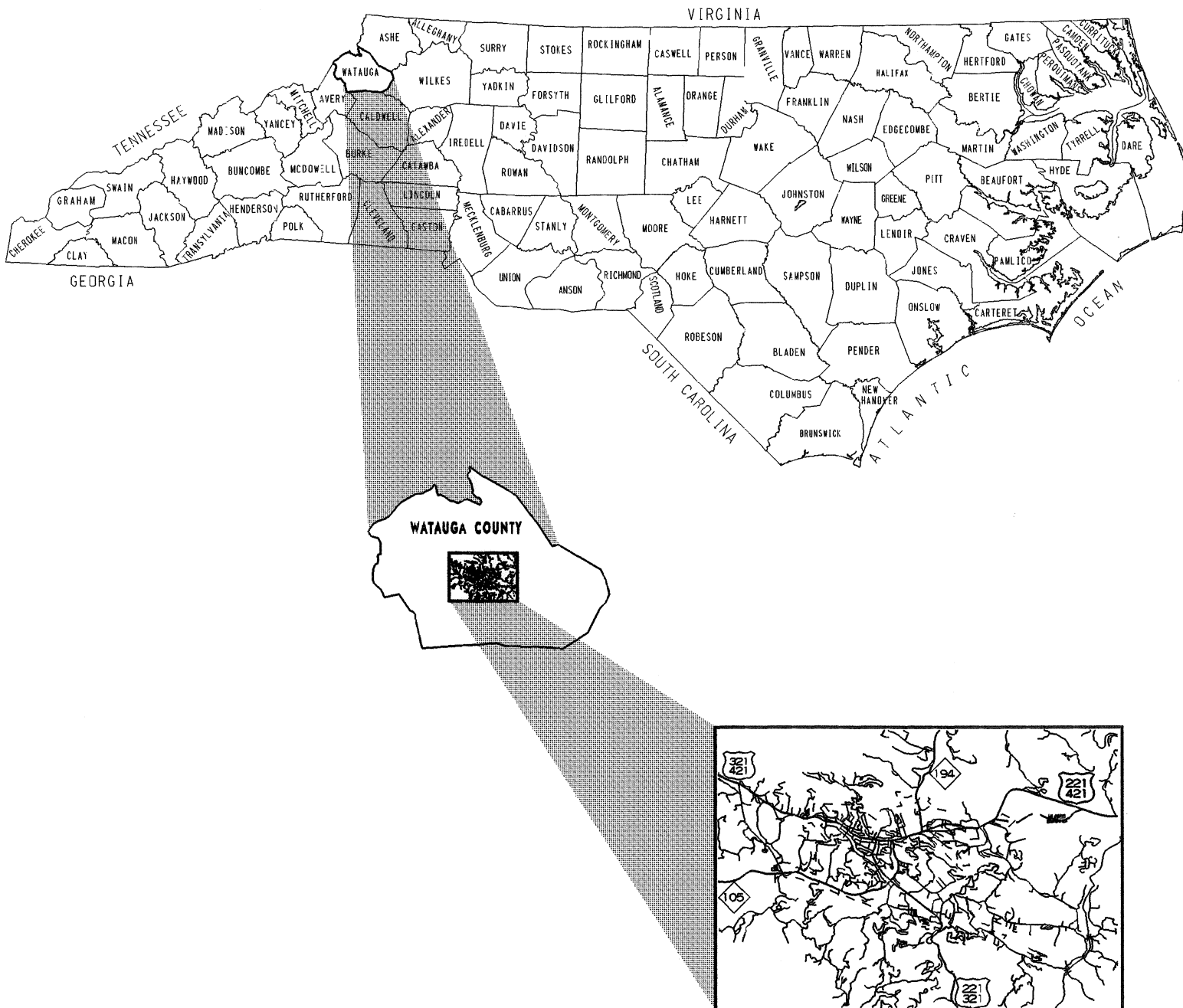


FIGURE 1

This Page Intentionally Left Blank

TRAFFIC ORIGINS AND DESTINATIONS

November 15, 2002

BOONE
WATAUGA COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

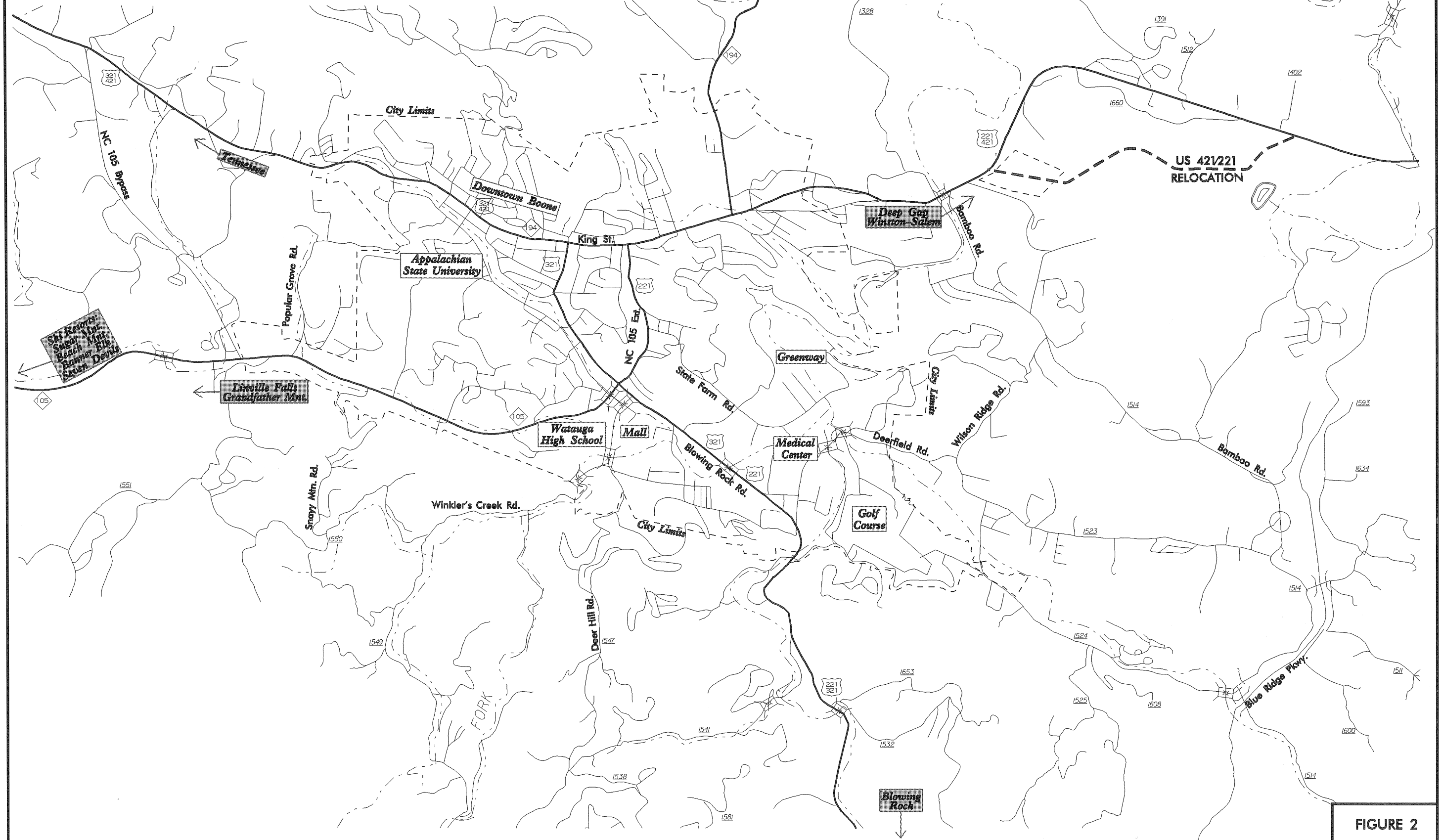
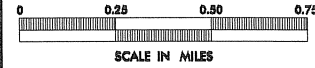


FIGURE 2

Back of Figure

STUDY AREA BOUNDARY

November 18, 2003

BOONE

WATAUGA COUNTY
NORTH CAROLINA

REVIEWED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

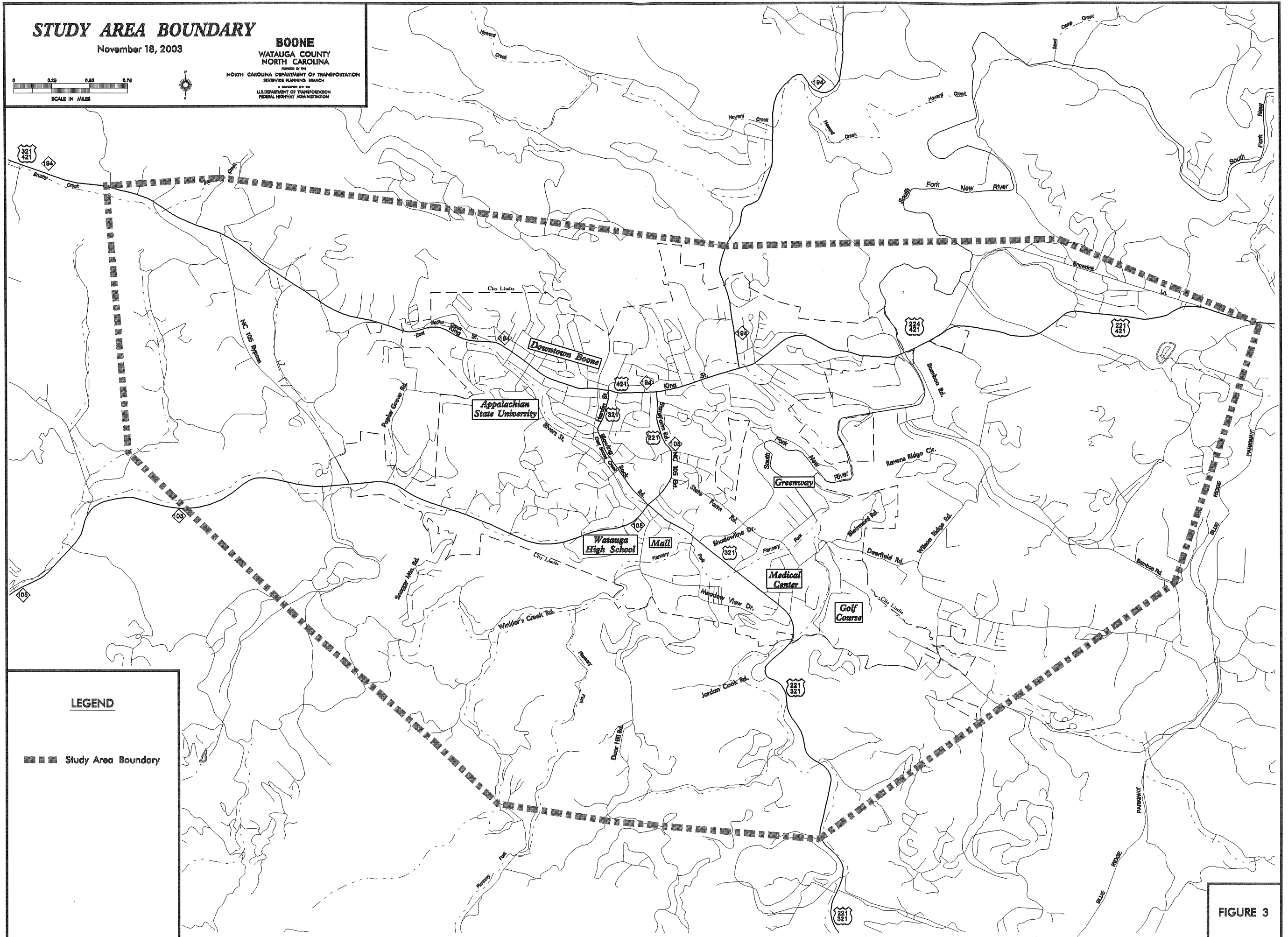
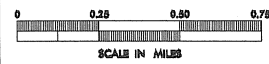


FIGURE 3

Back of Figure

U.S. 421 IMPROVEMENTS/DANIEL BOONE PARKWAY

AVERAGE DAILY TRAFFIC WITH NO IMPROVEMENTS

TIP PROJECT U-2703

BOONE
WATAUGA COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING AND ENVIRONMENT
TRANSPORTATION PLANNING BRANCH
101 EAST HICKORY STREET, SUITE 100
BOONE, NC 28606-1000
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE IN MILES

February 12, 2004

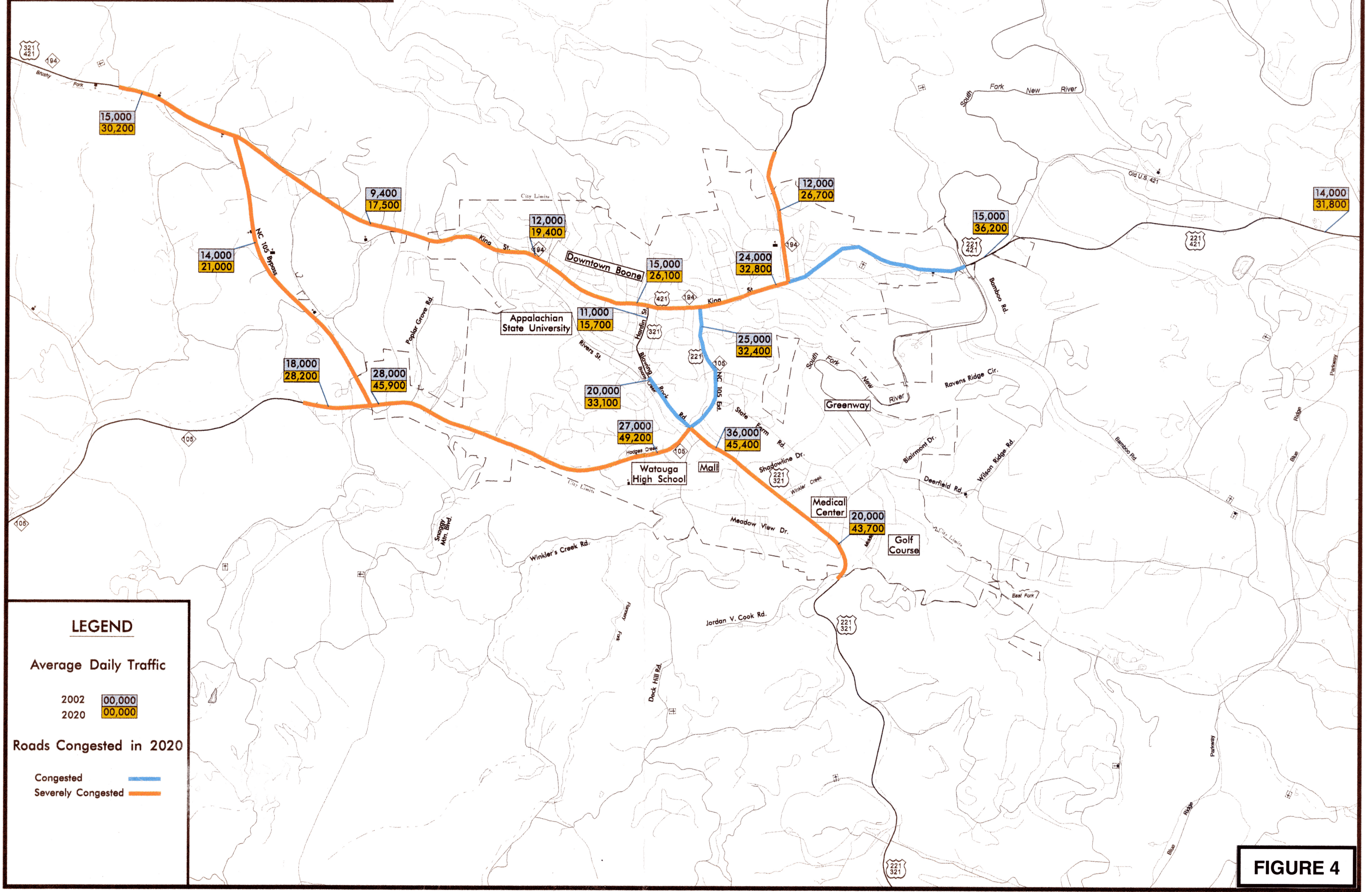


FIGURE 4

Back of Figure

2020 Major Through Traffic

**WATAUGA COUNTY
NORTH CAROLINA**

STATEWIDE PLANNING BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

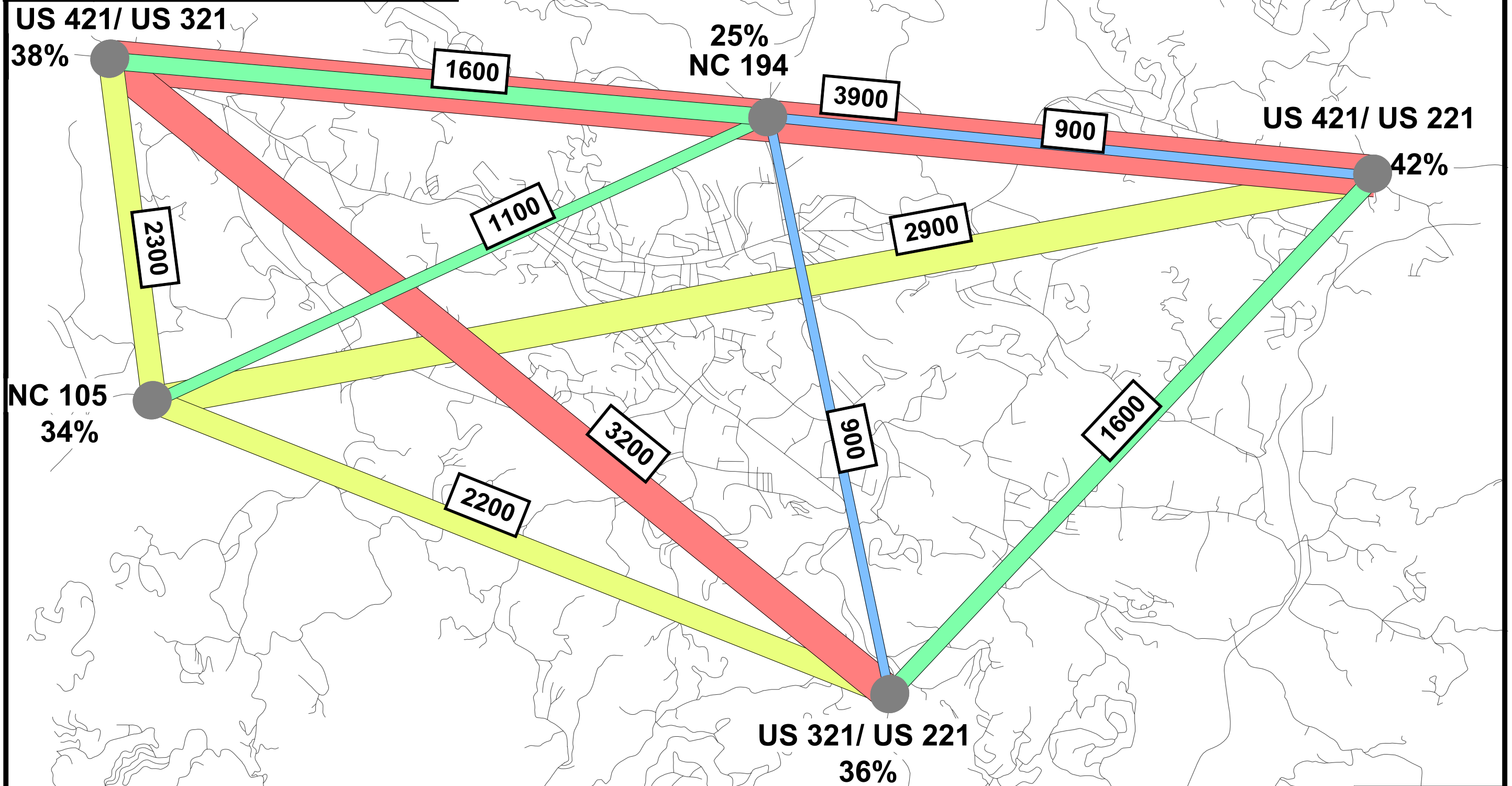


FIGURE 5

Back of Figure